DOCKET FILE COPY ORIGINAL

The CPB•WGBH National Center for Accessible Media

125 Western Avenue
Boston MA 02134

617 492 9258 (V/TTY)
Fax 617 782 2155

March 14, 1996

Office of the Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Dear Sir,

Please find enclosed comments of the WGBH Educational Foundation in response to the FCC's Notice of Inquiry: **Mass Media Docket no. 95-176.**

An original of our comments and nine copies (to provide personal copies for the Commissioners) are enclosed.

Thank you for the opportunity to provide comments in this matter.

Sincerely,

Larry Goldberg
Director

enc.

ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
Closed Captioning and Video Description	)	MM Docket No. 95-176
of Video Programming	)	FCC 95-484
	)	

NOTICE OF INQUIRY

COMMENTS OF THE WGBH EDUCATIONAL FOUNDATION
IN THE NOTICE OF INQUIRY REGARDING CLOSED CAPTIONING
AND VIDEO DESCRIPTION

To The Commission:

1. The WGBH Educational Foundation is writing in response to your request for comments in the "Notice of Inquiry," FCC 95-484, in the above-captioned proceeding, released December 4, 1995.

I. INTRODUCTION

2. The WGBH Educational Foundation is one of the country's leading public broadcasters and has long considered one of its central missions to be increasing access to media for people with disabilities. In 1971, WGBH established The Caption Center, the world's first captioning agency, to produce captions for TV programs so that deaf and hard-of-hearing viewers could gain equal access to those programs. Today, The Caption Center has more than 100 employees in three offices across the country and produces captions for every facet of the television and home video industry.

3. In 1990, WGBH launched Descriptive Video Service® (DVS®) to provide access to TV programs and home videos for blind and visually impaired people. Today, such PBS programs as *Mystery!*, *Nature*, *The American Experience*, and home videos like *Schindler's List*, *Beauty and the Beast*, *Forrest Gump*, and many others inform and entertain people who previously were unable to gain access to this medium which continues to define our culture as we enter the 20th century. A new partnership with the Turner Classic Movies cable channel will be providing video description of 12 movies starting in April 1996.

4. In 1993, in partnership with the Corporation for Public Broadcasting, the CPB/WGBH National Center for Accessible Media (NCAM) was established as an R&D facility designed to extend WGBH's previous media access efforts into new media and to further the uses of captioning and descriptive video in the home, classroom, workplace, and community.

II. BACKGROUND

5. In its Notice of Inquiry ("NOI") in this matter[1], the FCC makes reference to the history and benefits of captioning and description services, to the audiences for the Services, to previous FCC and Department of Education involvement in fostering and funding the Services, to pending legislation (H.R. 1555 and S. 652) which will affect the Services, and to the importance of the Services as "an important public interest."[2]

III. THE PUBLIC INTEREST BENEFITS OF CLOSED CAPTIONING AND VIDEO DESCRIPTION

6. *Demographic data.* We anticipate that demographic data on deafness and blindness will be submitted by other organizations in response to this Inquiry. There are some basic statistics on deafness upon which we have relied. (see below). WGBH also recently conducted research into the nature and extent of visual impairments as an essential function of the establishment and dissemination of its Descriptive Video Service and submits the data below regarding the population of potential beneficiaries of descriptive video.

7. Approximately 14 million Americans experience hearing loss so severe that they cannot comprehend spoken words. This group constitutes more than half the total number of deaf and hard-of-hearing individuals in the U.S., a figure placed at 22,680,000 by a 1990 National Center for Health Statistics survey. Senior citizens, whose hearing acuity diminishes as a natural part of the aging process, comprise 29% of the total population.

8. WGBH estimates that 11.5 million visually impaired people can benefit from descriptive video. WGBH has arrived at this figure in conjunction with the American Foundation for the Blind (AFB) and other professionals in the field of blindness and visual impairment. AFB has analyzed a variety of data on

---

[1] *FCC Notice of Inquiry*, "In the Matter of Closed Captioning and Video Description of Video Programming," released December 4, 1995, MM Docket No. 95-176.

[2] NOI at paragraph 9.

blindness and visual impairment and has written a widely used resource manual on the subject.[3]

9. The figure of 11.5 million visually impaired persons is based primarily on an annual measure collected by the Health Interview Survey (HIS) of the National Center for Health Statistics (NCHS). It includes people with any problem in seeing that is not correctable with ordinary glasses or contact lenses. In 1988, 11 million non-institutionalized people reported visual impairment, including color blindness.[4] A similar figure comes from the Census Bureau's 1984 "Survey of Income and Program Participation," which reported 12.8 million non-institutionalized persons, 15 years and older, who "have a limitation in seeing."[5] In addition, a conservative estimate of legally blind school children is approximately 45,000.[6]

10. Some basic demographic characteristics about the non-institutionalized visually impaired population have been reported; for example, most are elderly and female. Also, the non-white population's rate of vision loss is higher than for whites of all ages.[7] Among the estimated 11.5 million in the target population for descriptive video, there is, of course, a wide range of severity. Nearly 400,000 people report they are "blind in both eyes,"[8] plus 45,000 persons in nursing homes are reported to be "totally blind."

11. The National Center for Health Statistics says eye problems now rank third, after heart disease and arthritis, among chronic conditions that restrict the normal daily activities of people older than 65. The National Eye Health Education Program states "Over 60 million Americans are at high risk of losing their eyesight to glaucoma or diabetic eye disease. For glaucoma, this includes blacks over age 40 and everyone over age 60, and for diabetic eye disease, all people with diabetes. The National Eye Health Education Program is run by the

---

[3] *Data on Blindness and Visual Impairment in the U.S.*, second edition, Kirchner, American Foundation for the Blind, 1988.

[4] *Current Estimates from the National Health Interview Survey*, 1988, Series 10, No. 173, the National Center of Health Statistics, 1989.

[5] "Disability, Functional Limitation and Health Insurance Coverage 1984/85," Series P-70, no. 8, Bureau of the Census.

[6] American Printing House Register of Legally Blind School Children

[7] *Data on Blindness and Visual Impairment in the U.S.*, 2nd edition, Kirchner, American Foundation for the Blind, 1988.

[8] *Data on Disability from the National Health Interview Survey*, 1983-1985, LaPlante, U.S. National Institute on Disability and Rehabilitation Research, 1988.

National Eye Institute of the National Institute of Health, U.S. Department of Health and Human Services.

12. *Benefits of the Services for other populations.* In its Notice of Inquiry (paragraph 12), the FCC seeks information on ancillary uses of captioning and description. WGBH, in its history of research and development in access technologies, has encountered many valuable uses of these Services outside of the core purposes for which they were originally developed (access to television for people with sensory disabilities).

13. There is significant evidence that the audiences for captions and descriptions extend beyond the nation's approximately 22 million deaf and hard of hearing and 11.5 million blind and visually impaired persons. One additional audience for both services can be found among the elderly population. Many of these people experience losses in hearing or vision as a natural result of the aging process, but are unlikely to identify themselves -- or be identified -- as hard-of-hearing or visually impaired. While many older people are reluctant to use assistive devices, the discreet nature of captions and descriptions and the fact that no special equipment is needed, increase the likelihood of use among this population.

14. *Captioning - additional benefits for other populations.* Other audiences for captions are the millions of adults struggling with literacy, young children learning to read, and people of all ages learning English as a second language (ESL). As many as 26 million Americans cannot read or write. An additional 72 million lack the basic competencies to fill out employment applications or follow written job directions.[9] Only 2-4% of American adults requiring literacy services are reached by the present public and private programs.[10]

15. A growing number of studies have investigated the benefits of captioned television in hearing populations. Virtually all report captioning to be highly motivating, engaging students' interests and active participation in learning. Not only does captioned television capture students' attention, but its multi-sensory presentation of information makes learning new words and concepts easier. Further, these skills appear to transfer to experiences with print in related topics and in textbook reading as well.[11] Reading researchers are in

---

[9] Hunter, C.S. & Harman, D. (1979). *Adult Literacy in the United States.* New York: McGraw Hill.

[10] Sticht, T. (1988). "Adult Literacy Education," *Review of Research in Education,* volume 15.

[11] Neuman, S.B. & Koskinen, P. (1992). "Captioned Television as Comprehensible Input: Effects of Incidental Word Learning from Context for Language," *Reading Research Quarterly,* volume 27, 94-106.

universal agreement that gains in reading are strongly related to how much reading a person does.[12] Good readers read more and become better readers; poor readers read less and tend to fall behind. Captioned television serves a special purpose by providing additional time for reading. More time for reading leads to increased fluency and to gains in vocabulary and background knowledge.

16. ESL students have two related needs that are addressed through captioned television. They have a special need to increase vocabulary at basic levels. Vocabulary researchers agree that the overwhelming percentage of words readers know they acquire through context.[13] Captioned TV offers an even richer context for students than printed text because situational uses of words and idioms, and shades of meaning and nuance, can be conveyed visually as well as verbally.[14] In addition, ESL-origin students benefit from seeing an immediate spelling of words just uttered.

17. WGBH is aware of many uses of captions for literacy and ESL instruction. Several examples follow:

18. Milton Goldman, a Los Angeles high school reading and ESL teacher, uses captioned television programs with his remedial reading students. A few minutes into the program, he turns the sound off, forcing the students to read the captions on the screen in order to follow the story. Mr. Goldman conducts a variety of pre- and post-viewing activities designed to develop sight vocabulary, comprehension, and writing skills, and has published a guide entitled, *Using Captioned TV for Teaching Reading* (Phi Delta Kappa Educational Foundation, Bloomington, IN, 1993).

19. An article published by the National Reading Research Center describes the use of captioned television in a fourth-grade reading class of hearing students. The teacher selects captioned programs appropriate to the curriculum. After the students have watched the program once with captions, the teacher introduces various vocabulary words from the program. The students then watch the program a second time and raise their hands when they recognize the words. The teacher pauses the video and the students discuss the words while looking at the video images. After the second viewing, the students

---

[12] Anderson, R.C.; Hiebert, E.H.; Scott, J.; & Wilkinson, I.A.G. (1985). *Becoming a Nation of Readers*. Washington, DC: National Institute of Education.

[13] Stanovich, Keith (1986). "Matthew Effects in Reading: Some Consequences of Individual Differences in the Acquisition of Literacy," *Reading Research Quarterly*, volume 21, number 4.

[14] Neuman, S.B. & Koskinen, P. (1992). "Captioned Television as Comprehensible Input: Effects of Incidental Word Learning from Context for Language," *Reading Research Quarterly*, volume 27, 94-106.

look for the same words on printed handouts which contain sentences from the captioned video.

20. The Adult Literacy Media Project, based at the Education Development Center in New York and funded by the Ford Foundation, is planning to incorporate captioning in an integral way in broadcast and/or cablecast video. They are planning pilot broadcasts in selected cities in approximately one year.

21. There is such a strong link between captioned television and literacy, that every major literacy organization endorsed passage of the Television Decoder Circuitry Act.[15] Furthermore, the use of captioned television is a frequent topic at conferences and conventions held by major literacy and ESL organizations.

22. *Video description - additional benefits for other populations.* Films and videos that contain video description appear to be especially well-suited to the needs of children with learning disabilities. Because the medium contains visually appealing video along with rich audio description, it has a high potential to capture a child's attention and enhance information processes. By providing similar information in two modalities, described video capitalizes on the different perceptual strengths of learning-disabled (LD) children, utilizing their stronger modality and pairing it with their less-developed modality to reinforce their comprehension of information. The extra verbal cues can help children with a non-verbal perceptual impairment, for example, use their well-developed auditory abilities to interpret the meaning of a character's smile (Foss, 1991). From a teacher's perspective, the learning acquired through viewing educational videos in the classroom could be particularly meaningful for LD students.

23. Since so little is known about using video description with students with learning disabilities, NCAM sought to test the concept by interviewing 22 professionals in the fields of learning disability, attention disorders and head injury; 17 watched a described videotape sampler before the interview (NCAM, 1995).

24. Interviewed experts noted that video description supplies multiple extra cues about what's important during the program, about how people interact, including visual and behavioral cues, and should help LD students grasp or figure out causal links for themselves. Overall, those interviewed felt

---

[15] Organizations which signed onto a TV Decoder Act letter of support which was submitted to Congress by the Gallaudet University National Center for Law and Deafness included: International Reading Association, Laubach Literacy International, Literacy Volunteers of America, National Education Association, National PTA.

that the following were potential beneficial features of video description for LD students:

- Description of body language, gesture, facial expression are provided which give clues for social pragmatics.
- Names of characters, which LD students easily confuse if they look alike or are dressed similarly, are reinforced.
- Transition in place and time, which LD students easily miss, are marked.
- Salient features of scene action are described, helping LD students who often get mired in detail.
- Key features of scene action are often presented *before* the action takes place, helping LD children anticipate and look for those features.
- Precise vocabulary is used in descriptions which labels what the student sees and might help integrate visual and auditory channels.
- The additional audio track helps focus students with poor ability to sustain attention.

25. The professionals familiar with non-verbal learning disabilities unanimously responded that this population is likely to benefit greatly from described videos, especially those that key viewers into body language, gesture, and facial expression. These subtle behavioral nuances, while challenging for students to interpret, are essential for understanding the dynamics of social interaction. Nonetheless, further research is needed to determine specific effects and benefits of video description for individuals with learning or cognitive disabilities.

26. *Video description for sighted viewers.* One viewer wrote to WGBH's DVS department with the following comments:

> "Even though my wife and I are fully sighted, as are our two children, we have found that the concise but colorful descriptions of the action on the screen helped us to enjoy our programs with a whole new dimension of perception. Often the narrator describes little details that we would certainly have missed, details which enhance our viewing pleasure. Our children have also increased their working vocabulary and have learned to be more observant participants in the shows they watch with DVS."
>
> - Ira Marc Goldberg, Los Angeles, CA

27. Descriptions can also be useful when a viewer is doing several things at once, needs to attend to something or leaves the room during a program. While these uses are not the original intent of the service, they need to be taken

into account when considering the potential audience for and potential benefits of video description.

IV. AVAILABILITY OF CLOSED CAPTIONING AND VIDEO DESCRIPTION

Availability of Closed Captioned Programming (NOI paragraph 14)

28. Accurate information about the growth and current extent of closed captioning on commercial, cable, syndicated and public television is best obtained directly from the sources of programming. There are a variety of caption providers serving the industry on both a national and local level. Our comments reflect only our own experience over more than two decades since WGBH founded the captioning industry. The following comments are supplemented by various statistics obtained from advocacy and consumer groups, most notably the National Association for the Deaf's publication, *NAD Broadcaster*, and Caption Database, an organization which compiled information on the availability of captioned videos.

29. *Broadcast Networks.* The amount of closed captioning has increased in recent years. One hundred percent of the ABC, CBS, NBC, and Fox prime-time schedule is accessible, as is the vast majority of the national schedule on PBS. Continued advances over the last few years have led to the addition of most of the commercial networks' late-night and daytime programming. News and children's programs are also virtually all captioned.

30. *Cable.* Most premium cable networks caption a significant amount of programming and a number of basic cable networks are beginning to participate in captioning. The proliferation of new cable networks adds to the growing amount of uncaptioned programs.

31. *Syndication.* Captioning in first-run syndication varies enormously. Some production companies regularly caption all of their offerings, others caption few or none. In the last few years, almost all major distributors of off-network series reformatted captions to accompany the programs' repackaged versions into syndication. Distributors who syndicate older series or older movies created before the advent of closed captions are less likely to provide captioned versions as they are newly syndicated. Captioning of older, "evergreen" programming is mostly due to the availability of U.S. Department of Education funds, often with some financial participation by the purchasing cable network or distributor.

32. *Local programming.* In our experience, captioning of local news is usually the first and most important access issue for deaf and hard-of-hearing communities.

33. The National Association of the Deaf estimates that of the 700 stations providing local newscasts, approximately 170 or 24% provide captioning. Of those 170 stations, approximately 30 or 17% offer real-time (live) captioning.[16] The remainder of stations provide electronically produced (passive) captioning, which transmits the TelePrompTer script (sometimes with camera and anchor cues sent as captions!), while leaving as uncaptioned all non-scripted dialogue, which often includes live interviews, late-breaking news, weather and sports.

34. *Home video.* Home video provides access to theatrical films otherwise not available to deaf and hard-of-hearing viewers in theaters. According to statistics compiled by Caption Database in 1995, most major home video companies in recent years have begun to caption some portion of their "A" titles or major releases, which account for approximately 5% of the videos made available each month. According to Caption Database, of all the videos released since the early days of the home video business (including theatrical, special interest and educational titles), approximately 10% have been captioned. Of all the videos currently being released to the public, approximately 20% are listed as captioned. Of all the educational, instructional or children's videos currently being released, an estimated 5% are captioned.

35. Approximately 4,000 videos have been open captioned through the Captioned Films/Videos Program funded by the U.S. Department of Education. These videos are loaned free of charge to an approved list of schools or organizations serving deaf and hard-of-hearing individuals. These open-captioned videos are not included in the statistics cited above.

36. Home videos of smaller theatrical films, network programs, syndicated series, and independent productions are often released uncaptioned even though some of these programs originally aired with captions. This is often due to a lack of awareness of the availability and need for re-use of captions and lack of coordination between the rights holders of programs and television distributors. Duplication of thousands of uncaptioned copies of a home video can occur before the television distributor makes the program available for captioning for broadcast. Subsequent distribution of these programs for the home video market often does not include the captions. Other technical problems frequently occur in home video duplication due to a lack of technical monitoring. Monitoring caption data during the initial encoding and subsequent duplication process would prevent most of the problems we observe of missing data and garbling - problems we hear about from caption viewers regularly.

---

[16] Goodstein, H. & Silver, T.R. (1995). "Broadcast and Cable TV Access," *The NAD Broadcaster*, volume 17, number 2.

Availability of Video Described Programming (NOI paragraph 16)

37. Video description produced by two organizations is available in the United States on a limited number of programs on PBS and select films on the Nostalgia Television cable channel.

38. According to the January/February 1996 DVS schedule, an average of 22 programs (23 hours not counting repeats) are available on PBS with video description each month. WGBH's Descriptive Video Service (DVS) provides video description for the following PBS series in their entirety:

- *Mystery!*
- *Nature*
- *The American Experience*
- *Scientific American Frontiers*

Selected programs from the following PBS series are described by DVS:

- *NOVA*
- *Mister Rogers' Neighborhood*
- *Masterpiece Theatre*
- Occasional PBS specials: Ken Burns' *Baseball, NOVA's Mystery of the Senses, People in Motion,* and *Sesame Street Stays Up Late.*

Since 1990, more than 1,000 broadcast programs have been described by WGBH's Descriptive Video Service.

39. Currently 131 public television stations (reaching 71% of U.S. households) have the necessary equipment to distribute DVS via the Second Audio Program (S.A.P.) channel to their viewers. (Attachment A contains the most current list of PBS stations equipped to carry the DVS service via S.A.P.).

40. Beginning in April 1996 the Turner Classic Movies (TCM) cable channel is scheduled to begin airing a selection of movies with video description, provided by DVS, on the Secondary Audio Program.

41. Major funding for all DVS activity -- broadcast, cable and home video -- is provided by the U.S. Department of Education. DVS also receives support from corporations, foundations, program producers and individuals. In addition, revenues from home video sales are used to expand the amount of video description.

42. To the best of our knowledge, video description is not yet available on a consistent basis on any other broadcast or cable network. Programming produced by other delivery systems (wireless cable, satellite master antenna (SMATV), direct-to-home satellite services, etc.,) is not described, as far as we know.

43. *Home video.* DVS also makes a selection of described home videos available through a direct mail catalog and at public libraries. The most recent DVS catalogue includes 130 described videos of which 62 are Hollywood hits such as *The Lion King, Forrest Gump* and *Schindler's List* and the remaining 68 are public television programs including *Anne of Green Gables, The Miracle of Life, Eyes on the Prize,* Ken Burns' *Baseball,* and *The Civil War.* In total more than 140,000 video titles are currently available for sale to the general public.[17] Less than 1/10 of 1% (.001) are available with video description.

44. *Other Delivery Systems.* We are not aware of any other broadcast or cable delivery systems carrying video description at this time. Direct-to-home satellite services can receive the entire signal including the S.A.P. channel. The arrangement with Turner Classic Movies will make video description available for about one million homes that receive TCM with direct broadcast satellite.

45. *Other Delivery Systems - Technical standards.* There is no guarantee that any provider will transmit video description intact, particularly when programming is obtained from outside sources and may be subject to signal processing, remodulation, or record and playback. In accordance with the Cable Television Consumer Protection Act of 1991, the Commission has adopted standards that require cable systems to retransmit broadcast signals in their entirety including, "if technically feasible, ...any program-related material transmitted by the broadcaster on a subcarrier or in the vertical blanking interval necessary for the receipt of programming by handicapped persons..." (102d Congress, Report 102-92, June 28, 1991).

46. These standards should be extended to all program providers or distributors to ensure that descriptions are transmitted intact. We would also argue that the conditional language ("if technically feasible") in the current standard is no longer needed, due to the preponderance of professional tape formats with multiple audio channels and the other hardware necessary to accomplish "receipt of programming by handicapped persons."

47. *IMAX Theaters.* DVS has provided "video" description for the IMAX theaters at the Boston Museum of Science and the Langley Air and Space Museum in Washington, D.C. IMAX films with video description include *Beavers, Destiny in Space, Grand Canyon, The Living Sea, Mountain Gorilla, Search for the Great Sharks, Titanica, Tropical Rainforest* and *Stormchasers.* The description is provided to the viewer via headsets which receive an infrared audio signal.

48. *Program Type.* In the past six years, DVS has described almost every type of programming on PBS and home video including drama, nature,

---

[17] *Video Source Book* from Gale Research, Inc., Detroit MI.

documentary, children's, science, educational, live programs[18], and popular movies (animation, comedy, drama, action/adventure, western, mystery, thriller, science fiction, musical and holiday favorites). We have had requests from our audience to describe all types of programming including situation comedies, public affairs, news, cable public access, talk shows, national political conventions, and the Olympic games, to name a few.

49. In four years, DVS has sold more than 40,000 described home videos at suggested retail prices totaling about $800,000 in sales. Since the video description cannot be turned off on described home videos (unlike closed-captioned videos) these sales are solely attributable to blind and visually consumers and organizations serving these populations. This was accomplished in a new market with direct mail sales alone and no funding for advertising. Based on these sales figures, we believe there is a significant market and audience for video description.

50. Beyond PBS and the Nostalgia cable channel, neither large nor small markets provide broadcast video description to the best of our knowledge.

51. *Additional efforts.* Public television stations WGBH, WNET, and WETA have all added a line item for video description in the budgets for at least one of their programs. DVS has also provided video description for the IMAX theaters (see above) at the Boston Museum of Science and the Langley Air and Space Museum. Funding for video description of IMAX films has come from both the exhibitor (museums) and the producer/distributor (MacGillivray Freeman, Inc. and the IMAX Corp.).

52. *Current availability - program types.* All programs become more accessible with video description, even panel discussions with little or no pauses in dialogue often allow just enough time to identify speakers. This is especially important at the beginning of a program before voices can be used as identifiers.

53. *Current availability - live programs.* We are not aware of any live description on television other than the five hours of video description of "The Clinton Inaugural: A PBS Special."

54 *Current availability - Second Audio Program channel.* Forty-eight percent of U.S. households had stereo TV receivers as of the spring of 1995 according to the Electronic Industries Association (E.I.A.). Seventy-five million U.S. households own one or more VCRs.[19] Information on the number of households with stereo VCRs or S.A.P. adapters is not available from the E.I.A.

---

[18] "THE CLINTON INAUGURAL: A PBS SPECIAL" - the entire 5 hours of MacNeil/Lehrer's coverage of the 1993 Presidential Inauguration

[19] *Video Week*, October 24, 1994, Vol. 15, No. 41 Warren Publishing, Inc.

55. More importantly, no current or complete local station survey exists as to S.A.P. broadcast or cablecast capabilities, outside of PBS stations (see Attachment A).

The Impact of Digital Television (NOI paragraph 17)

56. The Commission asks parties to comment on the potential impact of implementation of Advanced Television ("ATV") and digital technology on the Services. We anticipate both positive and negative impacts due to these implementations and suggest that the Commission carefully take into account these impacts when considering future actions.

57. Over the past decade, the television industry in the United States has been working on a new standard for advanced and high-definition television which is expected to eventually replace the present standard known as NTSC. Accelerated efforts in the past three years have yielded a unified specification for high-definition television from a coalition of industry proponents known as the "Grand Alliance." The work of this group has recently been submitted to the FCC for hearings and approval.

58. *Subcommittee work.* At the same time, a subcommittee of the Electronic Industries Association, the R4.3 Television Data Systems Subcommittee (TDSS), established a "Working Group on Advanced Television Closed Captioning." The TDSS had previously developed an industry-wide consensus for "Recommended Practices for Line-21 Closed Captioning" (documented as EIA-608[20]) which guided the FCC's Report and Order for specifications for built-in decoder circuitry as required under the TV Decoder Circuitry Act.[21]

59. *ATVCC Working Group.* The Working Group is made up of representatives of captioning agencies, caption equipment manufacturers, and TV receiver manufacturers. It's members were concerned that, although the TV Decoder Act required that caption reception and display capability be built into TV technology as it advanced, and though the proponents and designers of advanced and digital television were somewhat aware of this fact, no one was actually working on designing the specifications for how closed captions would be created, encoded, transported, decoded, and displayed.

---

[20] Available from Global Engineering Documents, 15 Inverness Way East, Englewood, CO , 80112-5704, 1-800-854-7179.

[21] 47 C.F.R. § 15.119; Implementation of the Television Decoder Circuitry Act, 6 FCC Rcd 2419.

60. The Working Group has been working on this problem for more than two years at this point, assisted in part by a grant from the U.S. Department of Education.[22] Unfortunately, the work of the Working Group is circumscribed by the limited time and resources of its members (two of six are non-profit agencies), and by the vast complexities of Advanced Television in its various forms. The issues involved in properly encoding and transporting both captioning and description have not been adequately addressed by the designers and developers of Advanced Television who are under tremendous time pressures in a marketplace where the stakes are exceedingly high. Therefore the work of the Working Group advances slowly as it works on the periphery of the rush to digital television.

61. *Bandwidth needs.* It is anticipated that ample bandwidth for both captioning and description can be made available in digital television technologies, whatever form they may take. But explicit action by the Commission is likely to be required eventually to formalize the amount of bandwidth to be set aside, the methods in which such bandwidth is utilized, and the guarantee that the bandwidth is constantly available to the Services in the immediate moments they demand them for timely and accurate delivery to the consumer. Instantaneous delays in delivery and scaled-down quality (i.e., lower bandwidth resulting in a lesser service) will not be acceptable for reliable, high-quality Services. Negotiations among experts on these issues may result in a workable consensus, but may not. Once decided, changes in the way the Services are delivered in the digital TV domain will be very difficult if not impossible.

62. *Digital to analog and back.* The Commission asks in paragraph 17 if it will be possible to transmit over a digital signal closed-captioning or video description data that are encoded in programming intended for the current analog transmission system. Certainly the broad and flexible nature of the digital signals will accommodate this sort of data. The newly introduced direct-to-home satellite systems (DSS and their competitors) have demonstrated that a digital signal can extract and separately transmit caption data for accurate reception and display. Alternate audio tracks for other languages have also been made available.

63. *No formal process exists.* However, these experiences are anecdotal and have not been codified or standardized, resulting in a situation where each manufacturer or program service is or will be attempting to solve these problems on its own. Anticipated failures of delivery will no doubt result and will be massively difficult to fix as a retrofit. For example, PBS is the only network to carry descriptive video in a broadcast S.A.P. channel. The present digital home

---

22 U.S. Department of Education PR/Award number H026R30003-95, "Special Research, Development and Evaluation: ATV Captioning: Development and User Testing of a Closed captioning System for Advanced Television."

satellite systems do not carry PBS programs and therefore the methodology of extracting the descriptions from a satellite-fed third audio channel and providing them to the end-user of a digital video system have not been experimented with or standardized as far as we know. And, as far as we know, no regulations require such systems of the present or future to carry the Services intact and in place.

64. The developers and manufacturers of the components of new digital TV systems need to be sure that their systems can handle captioning and description services properly and can deliver the Services intact and in place to the viewer. One example of what can happen to caption data in the digital domain was discovered when a new service was introduced by Pacific Bell for delivery of MPEG-2 compressed video to cable operators. An article in *Broadcasting & Cable Magazine*[23] describes the prototype service and an unintended consequence: "lack of closed-captioning in the feeds." (Attachment B).

65. It is encouraging to know that the closed caption problem was caught in this instance before full roll-out. However, no formal process or arena exists for the dissemination of technical information about closed captioning and video description.

66. In our experience, developers and manufacturers of technology are not opposed to designing their systems so that the Services are passed through properly. The problem is that the industry is simply unaware of the need. It is often very late in the design process when the first mention of captioning and description is made. Desired changes at that point can become very contentious, with consumers being asked to sacrifice a fully featured and well-designed service because of lack of early attention to the issue by industry. Early awareness of the need to build proper handling of access services into the design process could avoid the cost and difficulty of retrofitting later.

67. *Backward compatibility.* The Working Group has also been paying careful attention to the importance of retaining backward compatibility while advancing the state-of-the-art of captioning for the digital world. While tests have yet to be undertaken, the present draft Advanced Television Closed Captioning (ATVCC) Standard document makes provisions for maintaining service to NTSC caption consumers while transitioning to ATVCC digital captioning. Again, assistance and attention from the broader world of ATV will help ensure that the work of this small group benefits developers.

68. *Other useful services.* The Commission asks in paragraph 17 whether other services for people with vision or hearing disabilities can be allowed

---

[23] *Broadcasting & Cable,* December 11, 1995, pg. 91.

through digital technology. Indeed, many potential opportunities exist. The primary one for captioning is the accommodation of multiple streams or channels of captions with a menu available which indicates which of these channels are available on a chosen program. As many as 15 total caption channels could be available under the scheme proposed in the draft ATVCC Standard, where the primary channel would be a verbatim transcript of the audio portion of the program, the second could be an edited version (sometime referred to as Easy Reader captions), the third, fourth, fifth in foreign languages, etc.

69. *Multiple audio services.* Digital TV technology also allows for multiple audio channels, so that the need for a description track would not conflict with alternate language audio tracks, as in the case today with stereo television's S.A.P. channel, which can only handle one alternate audio service at a time. In should be noted however that these additional audio channels are bandwidth-intensive and the designers of the ATV system would need to relinquish more bandwidth than the basic monaural description channel indicated as being set aside in ATV documents examined by WGBH.

70. *Separable audio channels essential.* Today's broadcast video description service provides a full-program-audio-plus-description mix on the S.A.P. channel. This is necessary due to the fact that virtually no receivers offer the user the feature of selecting <u>both</u> the S.A.P. channel with descriptions and the main program with dialog and music and effects. Therefore, WGBH's Descriptive Video Service must, at a great deal of expense, mix all of the original audio plus descriptions onto the auxiliary audio track. In designing the audio portion of the ATV system, the question of whether the description track will be available for the user to mix into the other audio channels has not yet been settled to our knowledge. If this provision is made, the cost of producing description tracks will be lowered significantly. Services like WGBH's would be able to produce only the description track (perhaps with special codes which trigger a momentary decrease in main program audio when descriptions are being heard). The user will then select both description and main audio and have their "mix" taken care of by the receiver. This solution should be explored as a means of efficiently providing audio services to users of Advanced TV.

71. *Separable audio channels for hard-of-hearing viewers.* We have often heard from hard-of-hearing consumers that they wish the music and sound effects on TV programs could be lowered so that the dialog could be more readily heard. Based on our understanding of the TV production process, we have previously concluded that this wasn't a practical request to make of TV producers. However, with the flexibility and multiple audio services possible with Advanced Television, a separate "dry" dialog channel would indeed be possible.

72. *Other digital TV issues - video description.* Technical capability alone will not guarantee a widespread provision of this service. Effective implementation of video description will continue to call for support and close coordination among service providers, producers, broadcasters, networks, consumer equipment manufacturers and the government to provide an integrated delivery. The following are some areas for consideration.

73. Current standard technology allows for satellite transmission of multiple audio subcarriers, and digital compression schemes offer the possibility of many more. Yet many broadcast facility routing switchers and STL microwaves allow for synchronous processing of only two (stereo left and stereo right) audio signals with video. Video description requires (minimally) a third audio signal on this path. Without this capacity, description can be provided for a given program, but will ultimately fall on a broadcaster's tape room floor. Digital routing and transmission systems should provide every broadcaster the capability of transmitting the full program content - including video description - provided by a producer.

74. The audio scheme for Advanced Television would allow for simultaneous transmission of multiple audio services including video description, and promises a benefit to many underserved audiences. But this benefit will only be realized if these services can reach the widest audience, thereby providing for economies of scale. The capability to transmit and receive these services must be universal, that is, available in each market and through each delivery system.

75. Current consumer equipment standards require a user of video description to purchase a stereo television or VCR with a full MTS Stereo/S.A.P. decoder. (Stand-alone decoders are not widely available, and have limited functionality.) Stereo TVs and VCRs are generally available, but there is little standardization, and not all stereo sets are S.A.P.-equipped. Digital technology should ensure that all Advanced Television receivers are capable of processing the full range of audio services available, including video description. A new digital system which requires a special standalone device for receipt of either captions or video descriptions would be a disaster for consumers of these Services.

76. A final point of concern here is full access by blind and visually impaired consumers to screen-based programming menus. Alternative navigation tools (universal remote control design, "hot" keys, screen readers, voice feedback) are critical to ensure access to the complex media receivers and tools of the future. A user-friendly interface for blind and visually impaired consumers will be more user friendly for all consumers.

V. THE COST OF CLOSED CAPTIONING AND VIDEO DESCRIPTION (NOI paragraph 18)

77. The costs of producing and delivering captioning and video description vary due to a number of factors. A complete understanding of these issues helps to clarify the variety of estimates made for producing access services. The following discussion takes into account the prices and costs of WGBH's access services as well as our understanding of the marketplace.

Closed captioning costs

78. *Pre-produced (or off-line) captioning.* Accurately timed, placed, and grammatically correct captioning for pre-produced programming is a labor-intensive process, requiring up to 20 hours for every one hour of finished product. The cost to caption an hour of pre-taped (or off-line) nationally distributed programming ranges from $800 - $2,100 per hour of programming. The range in price depends on the required speed of turnaround, the amount of programming, the expertise and attention given to creation of the captions – timing, writing captions to appear on shot changes, identification of speakers, and artful description of non-speech information – as well as the technical capabilities and quality control measures offered by the vendor.

79. It is labor intensive to ensure that captions appear simultaneous with shot changes and that they are carefully placed to indicate who is speaking. The timing and placement of pop-on captions eases the reading of multiple pieces of information on screen at the same time. In our long-established training and production processes, the rule is that captions must follow the rhythm and visual energy of the program and convey the content and tone of dialog and other audio.

80. Less care and attention to accurate, typo-free, well-timed captioning can be less expensive, but the same is true of all facets of the television production process - the lighting, sound, make-up, sets, etc. Captions should be as carefully produced as these other facets of a television program.

81. *Live (or real-time) captioning.* Production of real-time captioning requires the skills of a stenocaptioner, a specially trained court reporter with the ability to listen to a program while it airs and phonetically transcribe the audio using an electronic stenotype keyboard. Stenocaptioners often work at speeds exceeding 220 words per minute. Using special software, a computer translates the phonetic keystrokes from the stenocaptioner's keyboard into caption data which are encoded into the broadcast signal. There is approximately a three-second delay between the time the words are spoken and their appearance as captions on the TV screen.

82. There is a shortage of trained stenocaptioners, although this situation is improving. Labor shortages produce higher labor costs. The court reporting profession has recognized the growing job market for stenocaptioners. The National Court Reporters Association recently created a new Certificate of Realtime Reporting (CRR) which tests court reporters' skills in this area. In addition, many of the court reporting schools are including information and training about closed captioning in their curricula.

83. The cost to caption an hour of live (or real-time) nationally distributed programming ranges from $300-$1,200. The range in price depends on the volume of work, the time of day of the broadcast, its length, the complexity of preparation, the means of access to the TV signal (via satellite, cable or phone), the required level of technical and staff back-up, and the need for archived and/or cleaned-up data for additional transmissions.

84. While real-time captioning requires specialized personnel, off-line captioning is actually more expensive to produce. Transcription of the audio track, thoughtful description of sound effects, accurate timing and placement of the captions all contribute to more time-on-task, and therefore to a higher per-finished-hour cost.

85. *Hardware and software costs.* More and more post-production houses are setting up caption production services and many have long had caption-data encoding capability (that is, integrating the data created out-of-house through the use of a caption encoder during the dubbing, or copying, process). Caption-creation software packages are readily available and are marketed in trade publications as well as at television industry conventions. Prices range from about $2,000 to $8,000 for the software alone. The hardware necessary to create captions ranges from $2,000 to $10,000; encoders, which are necessary for inserting the caption data into the video, range from $2,000 to $7,000. Most professional off-line captioning software packages are capable of reading timecode, and many allow the user to place captions in precise locations on the screen.

Video description costs

86. DVS rates range from approximately $4,000 per program hour for broadcast programs to about $10,000 per home video title. The rate depends on a number of factors including the level of description required, the amount of research necessary and the amount of lead time available. Real-time (live) programming costs depend on several factors including level of preparation and research required and the actual location of the event to be described.

87. The cost of video description varies by each individual program, not by program type. One dramatic program may require or allow for significantly more description than another. Documentaries may in general allow for less description but often require additional research.

88. *Equipment costs.* A describer's workstation at WGBH consists of a 3/4" VCR, Macintosh computer, a control interface and specially created software. To maintain the highest audio quality, consistent with PBS and Hollywood requirements, DVS uses the professional audio production suites at WGBH to mix and record DVS audio production and produce DVS broadcast masters. The cost for these facilities is similar to production operations at any broadcast or cable company.

89. One factor which will continue to have a major impact on the cost of video description is the current necessity to provide a complete program-plus-description mix on the third audio channel of a program whose descriptions will be heard via the Secondary Audio Program. This is due to the fact that almost none of the stereo VCRs and TVs manufactured provide the user with the option of selecting BOTH main program audio AND S.A.P. (descriptions). Instead, it was assumed that consumers would want EITHER main audio OR S.A.P. (alternative language usage was in mind -- if one wanted a Spanish audio track, the English track had to be switched off). The result is that the video description process for broadcasting requires an expensive mixing step rather than simply recording a description-only narration track.

90. In the field of digital television, the capability for the consumer to chose any combination of audio services simultaneously, if implemented, could dramatically reduce the cost of video description. There has not been to our knowledge any such requirement yet established for digital or advanced television. Additional technical capability of "ducking" codes would allow the description channel to momentarily lower the audio level of the main program audio, and, in essence, provide a mix live and on-the-fly. Experiments have not yet been done of this theoretical technology, but experts in the field agree that it is possible.

Supply of Closed Captioning and Video Description Services (NOI paragraph 19)

91. *Supply of Captioning Services* . The range of both off-line and real-time captioning rates is caused by a variety of factors inherent in caption production, as well as the recent growth of the captioning industry. More than 100 small captioning facilities have emerged as independent companies, or within post-production and duplication facilities, and in at least one major cable network.

92. WGBH welcomes competition and is well-known for having worked hard to ensure open standards. However, we are concerned that when price becomes the sole or deciding factor in choosing a vendor, quality will suffer accordingly, in terms of both presentation and technical standards. A key challenge in rapidly increasing the amount of captioned programming available is to uphold work standards which result in consistency, accuracy, and high-quality regardless of timing, deadlines, or capacity strains. We have found that successful in-house capability relies on the commitment to skilled labor, an arduous training program, and consistency of performance, research, and review regardless of time constraints.

93. The experience of the Canadian television industry with captioning may be of interest. According to the Canadian Association of Captioning Consumers, for a number of years, Canadian broadcasters have been under a mandate to caption a certain number of hours each year. Meeting this quota of captioned hours has been part of the license renewal process. However, the means, style, and quality of captioning has not been specified, resulting in at least one occasion where excessively fast, live-displayed, "roll-up" captions were used for a children's program which would have been better served by carefully edited and timed "pop-on" captions. The Canadian Association of Captioning Consumers also reports numerous consumer complaints about the use of automated ("electronic newsroom") captioning for local news programs.

94. These examples indicate a need for the FCC to consider the varying methodologies and importance of quality-control mechanisms as it prepares to establish the rules called for under the Telecommunications Act of 1996.

95. Any scarcity of service providers which might result from a mandated increase in closed captioning would be temporary and could be met by the entry of new vendors and the expansion of existing ones. A similar increase in available services that more than met demand was created by the TV Decoder Circuitry Act.

96. As noted above, there are a number of software and hardware vendors which address the demand for caption production. While software providers offer to train users to operate their products, there is no training in the process of closed captioning itself. The Caption Center occasionally receives calls from purchasers of captioning software, requesting training. Aside from Closed Captioning University (see below), which is available only to public television stations, there is no formal training program for creating closed captions, leaving open the future challenge of increasing both *quantity* and *quality* of captioning at the same time.

97. *Closed Captioning University.* While a substantial percentage of programs at the national level are closed captioned, only a small number of local programs are accessible to deaf and hard-of-hearing viewers. The

CPB/WGBH National Center for Accessible Media (NCAM) has addressed this situation by creating Closed Captioning University (CC University), which is designed to train America's public television stations to closed caption their own local and instructional programming. This unique service provides a week of intensive, hands-on training in the art of off-line captioning and stresses the need to create quality captions which serve local audiences. Funded by a grant from the Corporation for Public Broadcasting, CC University is currently available exclusively to public television stations, which pay only their own travel and living expenses. With this type of careful, focused training, public television stations will be much more likely to be able to deliver high-quality captioning on the local level.

98. *Supply of Video Description Services.* As mentioned above, WGBH's Descriptive Video Service and the Narrative Television Network are the main providers of the video description service. Several smaller organizations provide live description in theater productions on stage and in special movie screenings, but not for broadcast. DVS continually receives requests from viewers for additional programming with video description on PBS as well as on cable, commercial broadcast television, home video and several other forms of media from CD-ROM to Internet sites on the World Wide Web. Concern (and excitement) is now being heard regarding the possibility of adding closed descriptions on the new DVD home video format. It is our belief, knowing of the extent of description experience and talent in the country, that sharply increased demand for description services could be met by increased provision of the service by the present service suppliers and those wishing to enter the field.

Funding of Closed Captioning and Video Description (NOI paragraph 20)

99. *Funding of Closed Captioning.* A wide range and variety of funding mechanisms exist for proliferating captioned programming. The specific policies and practices of different distributors is probably best explained by the networks, producers and distributors themselves. This summary of the status of funding arrangements provides an historical perspective of The Caption Center's experience rather than comprehensive statements about current policies.

100. ABC, CBS and NBC were involved with PBS and the U.S. Department of Education in the development and introduction of captioning technology in the late 1970s and early 1980s. In order to expand the service through shared expenses, cooperative partnerships involving the networks, producers, U.S. Department of Education, caption agencies, and corporate sponsors evolved. U.S. Department of Education funding provided critical seed money for this effort and still plays a critical role in making large-volume

programming accessible. Each year, more of the costs of captioning this programming is shared by private-sector funding mechanisms.

101. We have noted that most premium cable networks have developed captioning budgets and/or delivery requirements which include captioning. Recently HBO established an in-house captioning unit for prerecorded programs, but it continues to use outside vendors to caption live programming. Some basic cable channels have established captioning budgets, though many basic cable channels continue to have very limited, if any, participation in captioning.

102. Caption agencies have been able to cover captioning costs, in whole or in part, of some basic cable programming through Department of Education grants in recent years. Those grants which encourage or require private-sector participation have been a very powerful incentive in generating budgetary commitments from cable networks. Multiple grants per program area are awarded to multiple vendors in response to competitive proposals which are judged on price, depth of technical expertise, quality control and monitoring, overall experience, private-sector participation, and fundraising expertise.

103. Throughout The Caption Center's history, we have sought to leverage private-sector funds through judicious application of federal dollars, thereby providing more captioned programming. Last year, we leveraged significant matching funds (between 33% and 40% of total captioning costs) from the private sector for the following grants: National News and Public Affairs Programming; Movies, Mini-series and Specials; Syndicated Programming; and Children's Programming. In all of our grants, each year, we have increased the amount of private-sector matching dollars by securing producer, network, or distributor involvement and by fundraising for caption sponsorships from corporations and foundations.

104. With the belief that captioning services needed to be considered as automatic and as valued a part of the final production as the audio track, WGBH-TV set a policy in 1982 that captioning was to become a mandatory line item in all of its national production budgets. This had a significant impact in that WGBH productions have annually made up an average of one-third of the national PBS schedule. The Corporation for Public Broadcasting also includes captioning in its delivery requirements for any production receiving its funds as does the National Science Foundation and the National Endowment for the Arts.

105. *Funding of Video Description.* Since 1990, several federal agencies have funded video description, including the Corporation for Public Broadcasting, National Endowment for the Arts, National Science Foundation and primarily the U.S. Department of Education. For fiscal year

1996, the Office of Special Education and Rehabilitation Services of the U.S. Department of Education awarded a total of $1.5 million for video description. WGBH, Narrative Television Network, and the American Foundation for the Blind were each awarded a portion of these funds. (The grants awarded to WGBH and NTN are for production and outreach, the funds awarded to the American Foundation for the Blind are for research). Approximately 65% of the total operating budget for DVS comes from the above-mentioned Federal grants, the remainder is from corporations and foundations, home video revenues and individual viewer donations.

106. Producers and distributors have begun to pay for video description as well, including WETA, WNET, WGBH and MacGillivray Freeman, Inc.. Video description for specific series or programs has also been funded by foundations and corporations as well as underwriters who have provided program production funds, such as General Motors for Ken Burns' *Baseball*. In the home video market the U.S. Department of Education has funded video description in all cases but one. The one exception is the home video version of *Schindler's List* which was described with funds provided by the film's director/producer Steven Spielberg and the distributor MCA/Universal Home Video.

Current and Future Impact of Federal Funds on Closed Captioning and Video Description (NOI paragraph 21)

107. *Closed captioning.* Captioning would not exist today without the vital early support of federal funds. It has been our experience that the Captioning and Adaptation Branch of the Office of Special Education administers an effective program which fosters competition and which continually increases the amount of private-sector involvement.

108. The Caption Center administers portions of the following grants: National News and Public Affairs Programming; Movies, Mini-series and Specials; Daytime Programming; Children's Programming; and Syndicated Programming. U.S. Department of Education funds are invaluable in leveraging private-sector support within each of these program areas, which in turn stretches government money to make even more programming accessible.

109. Proposals for U.S. Department of Education funds require competitive pricing from applicants. It is equally important to note that Department of Education Requests for Proposals also REQUIRE technical expertise, established standards, outreach to consumers, technical and quality-control monitoring, successful track records, and appropriate equipment and back-up. The U.S. Department of Education's competitive grant requirements and multiple awards have grown the service and lowered prices, while keeping quality high. Department of Education grants also differentiate between large-